

## 780 CMR 3622

### SOLAR SYSTEMS

**3622.1 Solar systems, general:** 780 CMR 3622 provides for construction, installation, alteration, and repair of equipment and systems utilizing solar energy to provide space heating or cooling, hot water heating, and swimming pool heating.

**NOTE 1:** Also see energy conservation provisions, 780 CMR 3603.

**NOTE 2:** Solar systems shall conform to all applicable requirements of 248 CMR.

**3622.2 Installation:** Installation of solar energy systems shall comply with 780 CMR 3622.2.1 through 3622.2.7.

**3622.2.1 Access:** Solar energy collectors, controls, dampers, fans, blowers, and pumps shall be accessible for inspection, maintenance, repair, and replacement.

**3622.2.2 Roof-mounted collectors:** The roof shall be constructed to support the loads imposed by roof-mounted solar collectors. Roof-mounted solar collectors that serve as a roof covering shall conform to the requirements for roof coverings in 780 CMR 3609. When mounted on or above the roof coverings, the collectors and supporting structure shall be constructed of noncombustible materials or fire-retardant-treated wood equivalent to that required for the roof construction and such mounting shall be engineered to ensure proper structural support, unless the collector and mounting design satisfies the criteria set forth in Table 3622.2, including all Table notes.

**3622.2.3 Pressure and temperature relief:** System components containing fluids shall be protected with pressure- and temperature-relief valves. Relief devices shall be installed in sections of the system such that a section cannot be valved off or isolated from a relief device. Such pressure and/or pressure-temperature relief devices shall conform to all pertinent requirements of 248 CMR or ASME Boiler and Pressure Vessel Rules as applicable.

**3622.2.4 Vacuum relief:** System components that may be subjected to pressure drops below atmospheric pressure during operation or shutdown shall be protected by a vacuum-relief valve.

**3622.2.5 Protection from freezing:** System components shall be protected from damage by freezing of heat-transfer liquids at the lowest ambient temperatures during operation.

**3622.2.6 Expansion tanks:** Expansion tanks in solar energy systems shall be installed in accordance with 248 CMR and possess ASME Boiler and Pressure Vessel stamps if applicable.

**3622.2.7 Roof penetrations:** Roof penetrations shall be flashed and waterproofed in accordance with 780 CMR 3609.

**3622.3 Labeling:** Labeling shall comply with 780 CMR 3622.3.1 and 3622.3.2.


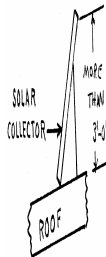
**Exception:** Collectors and/or thermal storage units that are site-built except such labeling that would otherwise be required by state and/or federal agencies having jurisdiction.

**3622.3.1 Collectors:** Collectors shall be listed and labeled to show the manufacturer's name, model, serial number, collector weight, maximum allowable temperatures and pressures, and the type of heat transfer fluids allowed

**3622.3.2 Thermal storage units:** Pressurized thermal storage units shall be listed and labeled to show the manufacturer's name, model, serial number, maximum and minimum allowable operating temperatures and pressures, and the type of heat transfer fluids allowed

**3622.4 Prohibited heat transfer fluids:** Flammable gases and liquids shall not be used as heat transfer fluids.

Table 3622.2  
ALLOWABLE SPANS FOR ROOF RAFTERS  
SUPPORTING CERTAIN SOLAR COLLECTORS

								
Member	800 psi (spruce or better) MAX SPAN		1200 psi (hemfir or better) MAX SPAN		800psi (spruce or better) MAX SPAN		1299 psi (hemfir or better) MAX SPAN	
	LRC	HRC	LRC	HRC	LRC	HRC	LRC	HRC
2 x 6								
12" o.c.	9-1	8-8	11-3	10-8	7-0	6-9	8-10	8-6
16" o.c.	7-11	7-5	9-9	9-3	6-0	5-10	7-6	7-3
24" o.c.	6-8	6-0	7-11	7-5	4-10	4-9	6-0	5-10
2 x 8								
12" o.c.	12-2	11-7	15-1	14-4	9-7	9-3	12-0	11-7
16" o.c.	10-6	10-0	13-0	12-4	8-2	7-11	10-3	9-11
24" o.c.	8-6	8-1	10-6	10-0	6-5	6-3	8-2	7-11
2 x 10								
12" o.c.	15-9	14-11	19-6	18-5	12-7	12-1	15-9	15-2
16" o.c.	13-6	12-10	16-9	15-10	10-9	10-4	13-5	12-11
24" o.c.	10-11	10-5	13-6	12-10	8-6	8-3	10-8	10-4
2 x 12								
12" o.c.	19-4	18-4	23-11	22-7	15-8	15-0	19-7	18-10
16" o.c.	16-8	15-9	20-6	19-5	13-4	12-10	16-9	16-1
24" o.c.	13-5	12-9	16-7	15-9	10-8	10-3	13-4	12-10

CRITICAL NOTES TO TABLE 3622.2  
ALLOWABLE SPANS FOR ROOF RAFTERS  
SUPPORTING SOLAR COLLECTORS

- HOW TO USE TABLE 3622.2:
1. Check to determine that none of the maximum conditions listed below are exceeded (see all Notes)
    - a. maximum pitch of collectors - 20:12 (60°)
    - b. maximum collector weight - seven lbs. per sq. ft.
    - c. maximum length of collector - nine ft.
  2. Determine whether Condition A or Condition B applies.
  3. Inspect roof rafters and determine their size, spacing & type of wood. (Most are hemfir or better).
  4. Determine whether light roof construction (LRC-asphalt, wood shingles, etc.) or heavy roof construction (HRC-slate, tile shingles, etc.) applies.
  5. Read allowable span from tables. Rafter spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

ADDITIONAL CONSTRUCTION CRITERIA:

Provide solid blocking between each panel connection to roof. Lag bolt or through bolt panel connection to rafters or blocking.

For situations exceeding any maximum condition listed above or not shown in Condition A or B, the structure shall be approved by a licensed professional engineer or registered architect

DESIGN CRITERIA (Table 3622.2):

**Strength:** ten lbs per sq. ft. (Light roof construction-LRC) or 15 lbs. per sq. ft. (heavy roof construction-HRC) as noted plus 30 lbs. per sq. ft. live load plus load of drifting snow plus loads of solar collectors determine fiber stress.

**Deflection:** For 30 lbs. per sq. ft. live load, deflection shall be limited to span in inches divided by 180.